

Amendments to the Claims

1. (Currently amended) An ETC (electronic toll collection) system, comprising:

an antenna having a predetermined directivity for providing a limited radio-communication service zone that extends from the antenna and covers at least a portion of the area of a lane under the antenna, and which length along the lane is set to a distance which approximates a single vehicle;

a single vehicle sensor within said system and positioned within said service zone at a location closer to oncoming vehicles than said antenna by a predetermined interval for detecting a vehicle which reaches a predetermined position defined in the limited radio-communication service zone, the predetermined position being defined by the location of the vehicle sensor such that only one vehicle is within said service zone and sensed by said vehicle sensor at any one time;

first means for continuously transmitting a radio signal via the antenna independently of whether or not the vehicle sensor detects the vehicle;

second means for deciding whether or not a radio response from a vehicle to the radio signal is received via the antenna;

third means for, in cases where the second means decides that a radio response to the radio signal is received, judging that there is an ETC vehicle coming into the limited radio-communication service zone in response to the detection of a vehicle by said sensor within said service zone; and

fourth means for, in cases where the vehicle sensor detects a vehicle while the second means decides that a radio response to the radio signal is not received, judging that there is a non-ETC vehicle coming into the limited radio-communication service zone.

2. (Canceled)

3. (Previously presented) An ETC system as recited in claim 1, wherein the distance of the limited radio-communication service zone is greater than a length of the vehicle and smaller than twice the length of said vehicle.

4. (Previously presented) An ETC system as recited in claim 1, wherein the length of the limited radio-communication service zone is about 6.5 m.

5. (Canceled)

6. (Currently amended) An ETC (Electronic Toll Collection) system, comprising:

an antenna having a predetermined directivity for providing a limited radio-communication service zone that extends from the antenna and covers at least a portion of the area of a lane under the antenna, and which length along the lane is set to a distance which approximates a single vehicle;

a single vehicle sensor within said system and positioned at a location within said service zone closer to oncoming vehicles than said antenna by a predetermined interval for detecting whether a vehicle has reached a predetermined position defined in said limited radio-communication service zone, the predetermined position being defined by the location of the vehicle sensor such that only one vehicle is within said service zone and sensed by said vehicle sensor at any one time;

transceiver means working cooperatively with said antenna for continuously transmitting a radio signal at a given rating level to cover the limited radio-communication service zone independently of whether or not the vehicle sensor within said radio-communication service zone detects a vehicle and for detecting a radio response to said radio signal from each vehicle detected by said vehicle sensor within said radio-communication service zone; and

processor means for deciding a vehicle that has been detected by said vehicle sensor in said radio-communication service zone is a non-ETC vehicle if no radio response to said radio signal is detected from said vehicle.

7. (Previously presented) An ETC system of claim 6, wherein said processor means decides a vehicle that has been detected by said vehicle sensor in said radio-communication zone is an ETC vehicle if a radio response to said radio signal is detected from said vehicle.

8. (Previously presented) An ETC system as recited in claim 1, wherein the antenna is one in number.

9. (Previously presented) An ETC system as recited in claim 1, wherein the antenna comprises a matrix array of antenna elements.

10. (Previously presented) An ETC system as recited in claim 6, wherein the antenna comprises a matrix array of antenna elements.

11. (Previously presented) An ETC system as recited in claim 3, wherein the distance of the limited radio-communication service zone is about 6.5 m.

12. (Previously presented) An ETC system as recited in claim 6, wherein the distance of the limited radio-communication service zone is greater than a length of the vehicle and smaller than twice the length of said vehicle.

13. (New) An ETC (Electronic Toll Collection) system, comprising:

an antenna for directing a limited radio-communication service zone to cover at least a portion of the area of a lane under the antenna, the distance along the lane covered by said antenna approximating the length of a single vehicle;

a single vehicle sensor within said system and positioned at a location within said service zone closer to oncoming vehicles than said antenna by a predetermined interval for detecting whether a vehicle has reached a predetermined position in said limited radio-communication service zone, the predetermined position being defined by the location of said vehicle sensor such that only one vehicle is within said service zone and sensed by said vehicle sensor at any one time;

a transceiver working cooperatively with said antenna for continuously transmitting a radio signal to the limited radio-communication service zone independently of whether or not the vehicle sensor within said radio-communication service zone detects a vehicle

and for detecting a radio response to said radio signal from each vehicle detected by said vehicle sensor within said radio-communication service zone; and

a processor for deciding a vehicle that has been detected by said vehicle sensor in said radio-communication service zone is a non-ETC vehicle if no radio response to said radio signal is detected from said vehicle.